

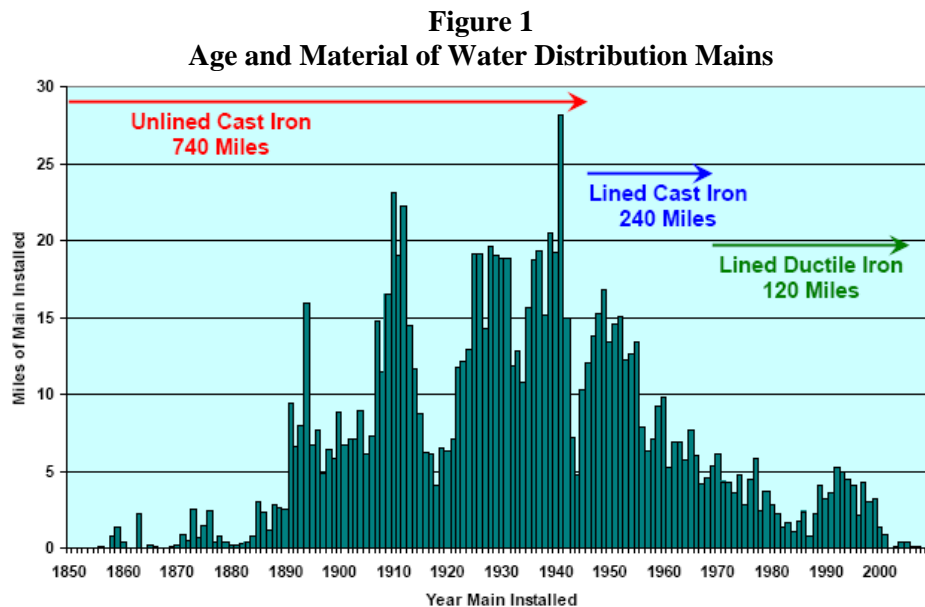
**DC Water Green Project Business Case Justification Sm Dia Main 7.docxProject
Information Required for Determination of Eligibility
For the
Green Project Reserve Funds**

**District of Columbia
Water and Sewer Authority**

Small Diameter Water Main Rehabilitation 7

1. Description of Project

There are approximately 1,100 miles of water distribution mains (12-inch diameter and smaller) in the DC Water system. Figure 1 provides a graphic showing the age and material of the distribution mains. The median age of all the water mains in the DC Water system is 77 years with a median installation date of 1933. Approximately 740 miles of distribution mains are unlined cast iron pipe that are known to be tuberculated, a condition which reduces hydraulic capacity and is a potential water quality concern. Also, the replacement of water mains with a significant break history and/or located in high pressure areas will reduce main breaks and existing leakage.



Unlined cast iron pipe was the material of choice for water distribution systems prior to the mid-1940s. Over time, corrosion within these unlined cast iron pipes commonly occurs and the inside of the pipes become encrusted and tuberculated. The degree of encrustation and tuberculation vary by location and age of pipe; however, these processes have historically caused:

- deterioration in water quality (e.g. “red water” and “muddy water” complaints),
- the potential for increased bacteriological growth within the system through the development of biofilms,
- reduction in the hydraulic capacity of the pipe, and

- increased pumping and maintenance costs.

To eliminate these and other issues, DC Water implemented a small diameter water main replacement and rehabilitation program. This program is included in the approved DC Water System Facilities Plan dated September 2000 and DC Water System Facilities Plan Update dated June 2009. The program consists of annual projects that replace or rehabilitate pipe that has exceeded the useful service life, improve available fire flows, and remove corrosion by-products from the inside of the pipe improving water quality and reducing the potential for creation of biofilms and bacteriological activity that can impair the quality of potable water. The objective is to replace pipe when the condition warrants replacement, or to clean and line unlined cast iron pipe provided the pipe is in sound condition. Also, when the pipe is replaced, the replacement of appurtenances, such as valves, fire hydrants and house service lines in public space are included in this project.

Cleaning and lining existing cast iron water mains and replacing existing mains will assist in protecting drinking water quality by removing existing tubercles from inside pipes in the distribution system where microbiological problems could develop because of the biofilm habitat afforded by the corrosion tubercles. In addition, the lining will prevent future corrosion within the pipe. The project will also improve the hydraulic capacity of the system; eliminate low pressure zones and lower maintenance and pumping costs within the system.

The Small Diameter Water Main Rehabilitation 7 project is part of a program that serves to rehabilitate pipe that has exceeded its useful service life, reduce main breaks, improve available fire flows, and remove corrosion by-products from the inside of the pipe improving water quality and reducing the potential for creation of biofilms and bacteriological activity that can impair the quality of potable water. The objective is to replace pipe when the condition warrants replacement, or to clean and line unlined cast iron pipe provided the pipe is in sound condition.

The locations where Small Diameter Water Main Rehabilitation 7 work is to be performed were determined based upon an evaluation using water main break data, information provided by operations (DC Water's Department of Water Services - Water Quality Branch and Distribution Branch); GIS water layer data (diameter, install date, material, etc.); DC Water's water & sewer CIP project locations; hydraulic model results; and other data. The evaluation prioritized candidates for small diameter water main rehabilitation, and, as a reference, please find a summary of findings below:

Water Quality

In early 2010, DC Water reviewed water quality concern locations, where repeated flushing has not significantly improved water quality or it degrades quickly after flushing. Most of these water quality complaints are of dirty water high in iron and color. Varying levels of iron and color are typically a result of older unlined tuberculated cast iron water mains. DC Water will continue to flush and monitor these locations.

- To address these water quality concerns, the replacement of approximately 20,000 LF of unlined cast iron water main (installed between 1910 and 1950) is proposed for Small Diameter Water Main Replacement 7.

Hydraulics

In 2010, DC Water reviewed their system hydraulics and identified locations with fire flow and operational issues that requires urgent improvements. This includes old unlined cast iron water mains installed between the 1870s and 1920s and mains where numerous repeated breaks have been recorded. To improve hydraulics, fire flows and operations over 12,500 LF of new water main installations is proposed for Small Diameter Water Main Replacement 7.

High Pressures in Proposed Anacostia 2nd High

In FY2013, it is planned that the St Elizabeth's Tank will be placed into service and pressures in the proposed Anacostia 2nd High Service Area (south of W Street, SE; east of 295; and west of 15th Street / Mississippi Avenue, SE) will increase 22.5 psi. Previous desktop analyses were completed to determine high pressure water mains that are old and have a break history. As a result, over 10 miles of water main replacement was included in previous contracts. Due to funding limitations, additional locations were deferred to future years.

Over 1,600 LF of water main replacement in the Proposed Anacostia 2nd High is included in Small Diameter Water Main Rehabilitation 7 and were selected based upon a review of the remaining high pressure areas that are not already programmed for replacement, main break data and other available data. Again, due to funding limitations, some locations may be deferred to future projects.

Table 1 provides the locations where Small Diameter Water Main Rehabilitation 7 is proposed, as of December 2010. The table includes the street location, pipe diameter, length, install date, number of recent main breaks, number of services to individual houses and number of services to apartments / high density multi dwelling buildings. As applicable, additional locations will be selected by DC Water following the method outlined above, so that funding is fully allocated for this project.

Table 1
Small Diameter Water Main Rehabilitation 7 Locations

Street	from Street	to Street	Quadrant	Pipe Dia (inches)	Approx Length (ft)	Install Date	Breaks (1)	Small Service (2)	Large Service (3)
WATER QUALITY LOCATIONS									
Meade St	Minnesota Ave	50th St	NE	8	2,510	1914-1930	1	65	0
Lee St	49th St	50th St	NE	8	970	1929	0	16	0
49th St	Meade St	Lee St	NE	8	560	1929-1931	0	5	0
50th Pl	Meade St	Lee St	NE	8	560	1930	0	4	0
50th St	Meade St	Lee St	NE	8	560	1930	0	6	1
Sheriff Rd	48th Pl	50th St	NE	8	1,330	1914-1930	1	22	0
Oakwood St	2nd St	Malcolm X Ave	SE	8	2,130	1935-1948	1	83	0
Malcolm X Ave	Oakwood St	Martin Luther King Jr Ave	SE	8	750	1940-1942	0	4	0
Hoban Rd	Foxhall Rd	Reservoir Rd	NW	8	1,560	1939	1	21	0
45th St	Hadfield Ln	Hoban Rd	NW	8	550	1935-1938	0	5	0
Foxhall Rd	Hoban Rd	Reservoir Rd	NW	12	740	1933-1950	0	4	0
Hadfield Ln	45th St	Hoban Rd	NW	8	580	1931-1952	0	6	0
Parkside Dr	Yorktown Rd	West Beach Dr	NW	8	2,520	1934-1955	1	20	0
Portal Dr	Roxanna Rd	East Beach Dr	NW	8	1,260	1928-1940	0	8	0
Primrose Rd	Portal Dr	16th St	NW	8	1,210	1939-1949	0	28	0
Roxanna Rd	Portal Dr	16th St	NW	8	900	1940	0	25	0
West Beach Dr	Primrose Rd	Yorktown Rd	NW	8	730	1941	0	8	0
West Beach Dr	Yorktown Rd	Kalmia Rd	NW	12	1,010	1931-1941	0	8	0
Yorktown Rd	Parkside Dr	West Beach Dr	NW	8	1,450	1934-1949	0	20	0
HYDRAULIC LOCATIONS									
H St	24th St	19th St	NW	6	2,770	1863-1873	3	8	3
M St	4th St	Florida Ave	NE	4	1,050	1872-1940	1	43	0
6th St	M St	K St	NE	6	1,190	1872-1873	2	38	1
7th St	Florida Ave	K St	NE	6	1,160	1892-1908	1	61	1
4th St	M St	L St	NE	6	750	1893-1903	0	58	3
Orleans Pl & Morton Pl	6th St	7th St	NE	8	1,360	1903-1905	0	96	2
L St	6th St	7th St	NE	8	700	1892	0	27	0
Florida Ave	M St	7th St	NE	6	320	1893	1	9	0
Alley South of L ST	6th St	7th St	NE	4	710	1889	0	25	0
16th St	Euclid St	U St	NW	12	2,520	1878-1891	5	25	6
PROPOSED ANACOSTIA 2ND HIGH LOCATIONS									
South Capitol Ter	Danbury St	Elmira St	SW	8	710	1946	0	0	0
Elmira St	South Capitol Ter	South Capitol St	SW	8	410	1946	0	7	0
South Capitol St	Forrester St	Galveston St	SW	8	490	1942	1	1	0

NOTES:

(1) Number of Water Main Breaks Recorded by DC Water from 2005 to 2010

(2) Number of Service Connections for Single Family and other Buildings with low demands / few users

(3) Number of Service Connections for Large Apartment / High Density Multi Dwelling Buildings with higher demands / many users

Additional Background Information

When DC Water was created in 1996, the initial focus was to make critical repairs to the water infrastructure to mainly address corrective actions required by EPA. Also, DC Water moved ahead with updates to planning documents that had not been revised in 30 years. In September 2000, DC Water completed its first Water System Facilities Plan that identified 14 projects to be included in the CIP, at a ten-year cost of just under \$300 million.

By FY2011, 9 of the 14 projects identified in the 2000 Facilities Plan had been completed. A summary of the status of these specific projects is presented in Table 2.

Table 2
Status of 2000 Facilities Plan CIP Projects (February 2011)

P6 Project	Project Description	Total Budget	Status
M6	Rehabilitation of Bryant Street Pumping Station	\$62.5 M	Completed FY2007
M701	Replacement of Anacostia Pumping Station	\$32.2 M	Completed FY2009
	New Fort Stanton Low Lift PS Pumping: Consolidated pumping into Anacostia Pumping Station.	See Above	
S4	48-inch (3rd High) / 42-inch (2 nd High) Internal Joint Seals	\$2.5 M	Completed FY2005
A3	16-inch Tie-In to McMillan	\$3.4 M	Completed FY2008
MR	5 MG 2 nd High Reservoir	\$15.2 M	Start Construction in FY2014
	48-inch 2 nd High Main	Not Programmed	
MQ	2 MG 4 th Elevated Storage Facility	\$7.9 M	Start Construction in FY2017
MO, NO & NP	Rehabilitate Boulevard & Good Hope Tanks	\$2.5 M	Completed FY2004
MJ02	Replacement of 20-inch Main in MLK Ave, SE	\$3.6 M	Completed FY2004
MJ01, M702 & MK	Replacement of 20-inch Main in Minnesota Avenue, SE and new 24-inch Main between Fort Stanton Reservoirs and MLK Ave, SE - Consolidated with other water main work	\$18.5 M	Completed FY2010
MA	2 MG Elevated Storage Facility at St. Elizabeths	\$21.5 M	Scheduled Completion FY2015
AK	WSSC Interconnections	\$2.6 M	Scheduled Completion FY2012

Also, DC Water moved forward with several programs in the water service area CIP that included but are not limited to:

- Small Water Main Rehabilitation Program: Since FY2003, approximately 176,570 LF of small diameter water main replacements have been completed or are under construction.
- Fire Hydrant Program: Through FY2010, over 4,300 hydrant replacements in public space were completed.
- Large Valve Replacement Program: Since FY2002, a total of 161 valve replacements have been completed or are under construction.
- Small Valve Replacement Program: Since FY2000, the replacements of over 460 defective valves throughout the District have been completed.
- Dead End Elimination Program: The 181 dead ends identified have been addressed.
- Lead Service Replacement Program: Through FY2009, the lead service replacement program has removed over 604,535 LF of lead water service pipe (17,650 addresses in public space and 2,834 in private space).

As the projects / programs outlined above were identified and implemented by DC Water since 1996, key design elements (as applicable) included improving energy efficiency, eliminating water loss and improving overall system hydraulics. This included replacing older pumps and motors with twenty-three new or rehabilitated units that have higher efficiency pumps and motors using current technologies. Using hydraulic modeling software, the optimum alignment and size of water main replacements were implemented. The DC Water standard pipe material for water main installation is ductile iron and, as shown in Figure 2, considerable energy savings could be quantified when ductile iron pipe material is used.

Figure 2

Pumping Cost In Dollars Per Year Per Pipeline

Based on pumping costs alone, Ductile Iron pipe saves you money every year. The amounts shown here are based on only one pipeline. In this example, annual savings with Ductile Iron pipe are \$9,149 when compared with pccp and steel; \$16,559 compared with pvc; and \$43,731 compared with hdpe. Imagine how much you could save over the life of your piping system by installing Ductile Iron throughout your system.

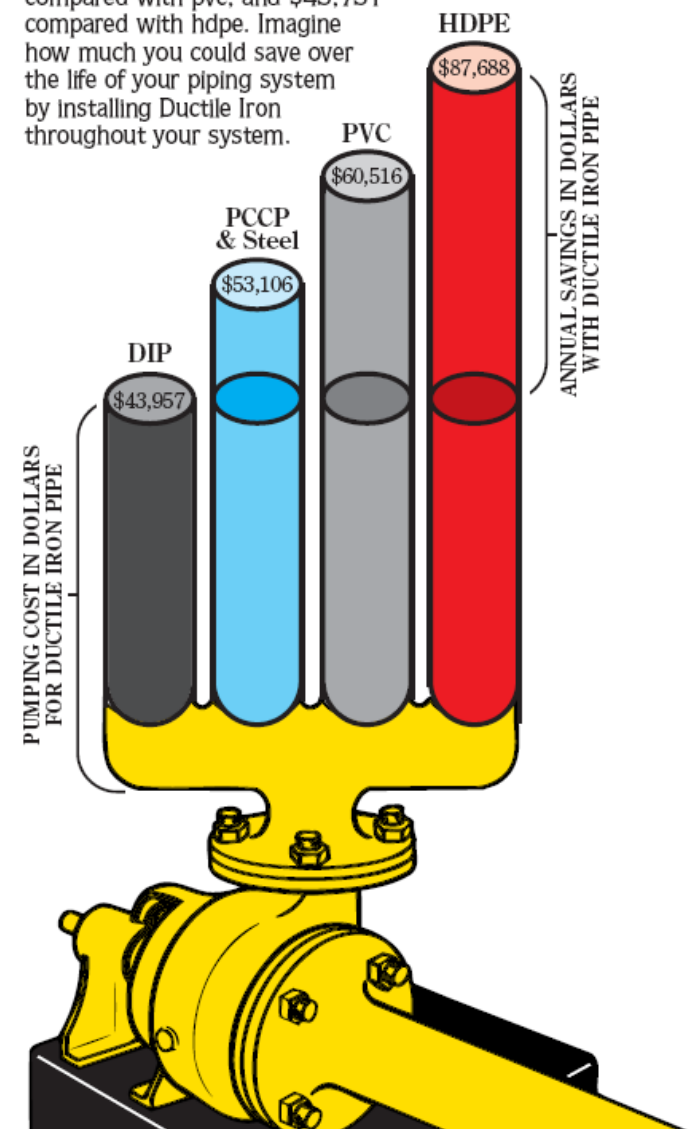


Figure 2 includes the cost to pump through a given pipeline as a function of head loss, pump efficiency, and power for:

- Ductile Iron Pipe (DIP)
- Prestressed Concrete Cylinder Pipe (PCCP) or Steel Pipe
- Polyvinyl Chloride (PVC) Pipe
- High-Density Polyethylene (HDPE) Pipe

Figure 2 is referenced from the HYDRAULIC ANALYSIS OF DUCTILE IRON PIPE document developed by Ductile Iron Pipe Research Association (DIPRA) and is available on the DIPRA website (<http://www.dipra.org/pdf/hydraulicAnalysis.pdf>). Additional details on ductile iron pipe head loss, C factor, diameters, pumping costs, energy savings, and value engineering can be referenced in this document.

Also, DC Water implemented a formal Asset Management Program (WASA Total Enterprise Asset Management System - WASA tEAMS using Maximo) to achieve the following benefits:

- Best practices for the design, maintenance, and renewal and replacement of infrastructure will achieve lowest life-cycle costs of assets and potentially reduce the gap between revenue and expenditures;
- Improved communication between DC Water and the customers through the measurement of "levels of service" will provide a clear understanding as to why and when investment in the system is needed;
- Information systems will facilitate data collection and analysis which will allow DC Water to proactively plan for the future and become more informed on the timing of potential future expenditures;
- Improved management of DC Water's repair and maintenance effort will be realized through planning and scheduling work which will also improve the management of DC Water's field personnel;
- Improved condition and reliability of assets will be realized through an actively managed preventive maintenance program;
- Increased asset "up-time" will be achieved by the use of semi-automated reordering of parts and material used to maintain assets. Lower inventory costs results through the concept of "just-in-time" ordering by using minimum/maximum stock levels, economic order quantities and safety stock levels;
- A complete inventory of assets are maintained which includes attribute and condition information; and
- The risk associated with operating existing critical assets and large system components will be addressed.

2. Project Justification

This water main project will improve hydraulics, eliminate or greatly reduce leaks, improve water quality and reduce water main breaks that would result in unplanned customer service outages.

DC Water's water distribution system has a median age of 77 years and includes 740 miles of unlined cast-iron mains. The consequences associated with ageing water mains include increased water loss due to undetected leaks and an increase in the frequency of bursts. A comprehensive water audit done by Severn Trent in 2001 reported that for each mile of water main in the DC Water system, the assumed leakage is approximately 4,500 gallons per day. Leakage levels reflect bursts, and background leakage has commonly been associated with system age, for example Francis (1994). A review of DC Water's Water and Sewer Enterprise GIS database along with break locations (spatially located from DC Water's main break data details) suggests that the leakage in the areas selected to be replaced is estimated to be significantly higher than the assumed system average. Table 3 provides details on the leakage prevented by replacing the water mains included in this project.

Table 3

SEVERN TRENT: DC WASA COMPREHENSIVE AUDIT SUMMARY REPORT - DECEMBER 2001	
Surfacing Leaks	3,219,000 gallons/day
Non Surfacing Leaks	2,570,000 gallons/day
Total Estimated Leakage	<u>5,789,000 gallons/day</u>
DC WATER's WATER SYSTEM	
Total Length of Water Mains	1,300 miles
System Average Number of Breaks	0.23 breaks/mile/year ^[1]
Surfacing Leaks	2,500 gallons/mile/day
Non Surfacing Leaks	2,000 gallons/mile/day
Total Estimated Leakage	<u>4,500 gallons/mile/day</u>
SDWMR 7 - LEAKAGE PREVENTED	
Length of Water Mains to be Replaced	7 miles
Existing Mains - Total number of breaks	19 breaks over 5 years ^[2]
Existing Mains - Average Number of Breaks	<u>0.54 breaks/mile/year</u>
Break Ratio Compared to System Average	<u>2.4</u>
Surfacing Leaks	15 MG per year
Non Surfacing Leaks	12 MG per year
Total Estimated Leakage	<u>27 MG per year</u>
Notes:	
^[1] Average number of small diameter breaks in the system based on a review of DC Water's Water and Sewer Enterprise GIS database along with break locations, spatially located from DC Water's main break data details.	
^[2] Number of Water Main Breaks Recorded by DC Water from 2005 to 2010. See Table 1	

The AWWA maximum allowable leakage for newly installed ductile iron pipe is 6.63 gallons per mile per inch per day using a 60 psi operating pressure. Therefore, the maximum allowable leakage for the ductile iron mains planned under this contract will be approximately 0.14 million gallons per year. The estimated water loss from the water mains planned to be replaced under this Contract is 27 million gallons per year, which is almost 200 times more than the total allowable leakage from newly installed water mains.

This project provides for a more watertight infrastructure because the water mains were selected in part for their age and break history. This project primarily includes the replacement with new pipe, which would eliminate existing leakage and reduce the potential of a pipe failure with resulting water losses.

Water Efficiency of this Project

Based on the above estimates for water loss, this project will conserve approximately 27 million gallons of water lost to leaks per year. This water loss is sufficient to supply almost 450 homes in the District.

In the guidance provided by the EPA in the Memorandum with subject “Award of Capitalization Grants with Funds Appropriated by P.L. 111-5, the “American Recovery and Reinvestment Act of 2009” ” (Hanlon, March 2, 2009), water efficiency was defined as “the use of improved technologies and practices to deliver equal or better services with less water.”

As discussed earlier, this project provides for a more watertight infrastructure because the water mains were selected in part for their age and break history and account for a total water savings of almost 27 million gallons per year.

Energy Efficiency of this Project

In the guidance provided by the EPA in the Memorandum with subject “Award of Capitalization Grants with Funds Appropriated by P.L. 111-5, the “American Recovery and Reinvestment Act of 2009” ” (Hanlon, March 2, 2009), “energy efficiency includes capital projects that reduce the energy consumption.” Energy is expended to produce finished drinking water at the water treatment plants and distribute the water using a system of pumps to supply proper pressure for consumption.

As discussed earlier, this project provides for a more watertight infrastructure because the water mains were selected in part for their age and break history and account for a total annual water savings of almost 27 million gallons. As a result, this will reduce the energy expended at the water treatment plants and pumping stations required to supply 29 million gallons per year. As the water main replacements in this project are scattered throughout the District, eliminating 27 million gallons in leakage per year it is estimated that close to 17,000 kWh of energy would be saved annually.

Also, this project includes the replacement of unlined cast iron mains with heavy internal corrosion-tuberculation, which results in a coefficient of friction (C-factor) of less than 40 for most of these mains. These unlined cast iron mains will be replaced with new ductile iron

mains that will have a C-factor of more than 100. The C-factor is a measure of the internal roughness of the pipe which is a function of the age, material and diameter. As roughness increases when the pipe ages, headloss increases and the C-factor declines. This increased headloss through the pipe (low C-factor) reduces the hydraulic efficiency of the system which causes higher energy costs because the energy required to pump water throughout the distribution system becomes greater. Therefore, replacing older unlined water mains with newer mains is more hydraulically efficient and can be considered an energy savings due to the reduction in pumping costs requirements at our Pumping Stations.

As presented earlier, the older unlined cast iron tuberculated water mains to be eliminated from the system as part of this project will be replaced with ductile iron pipe. For many years, ductile iron has been the standard material for water mains. Ductile iron pipe provides increased strength and increased ductility, which greatly improves robustness during installation and while in use. Also, the ductile iron pipe to be installed as part of this project will have an internal cement-mortar lining that will prevent tuberculation.

The following information on ductile iron pipe is as referenced from the Ductile Iron Pipe Research Association website (www.dipra.org):

- *Ductile's high degree of dependability is primarily due to its high strength, durability, and impact and corrosion resistance. Ductile Iron has minimum strength requirements of 60,000 psi tensile strength, 42,000 psi yield strength, and 10 percent minimum elongation. Designed and manufactured to the industry's most stringent standards, Ductile Iron pipe resists damage during shipping and handling, and, once installed, withstands the most demanding operating conditions, including water hammer, frozen ground, deep trenches, areas of high water table and heavy traffic, river crossings, pipe on supports, rocky trenches, and areas of shifting, expansive, and unstable soils. Additionally, numerous laboratory and field tests have proven that Ductile Iron's corrosion resistance is equal to or greater than that of Cast Iron, which has a service history that is unequaled by any other piping material."*
- *In normally specified pipe sizes, cement-mortar lined Ductile Iron pipe has an internal diameter that is larger than the nominal pipe size. For most substitute pipe materials, the inside diameter is equal to or less than the nominal diameter. When this difference is taken into account, significant savings can result from the use of Ductile Iron pipe.*
- *Laboratory tests have been conducted on cement-mortar-lined iron pipe at the extremes of the normally recommended operating flow velocities — namely 2 fps and 10 fps. The test results reported Hazen-Williams coefficients ranging from 150-157. When these laboratory tests were plotted on the Moody diagram, the plotted points generally conformed to the curve for "smooth pipes." This demonstrates that other pipe materials might be touted to have higher flow coefficients, but in reality none of those materials is "smoother" than Ductile Iron pipe. To suggest that a "smoother" pipe is available would require stepping outside the bounds of modern hydrodynamics.*

In addition to the above, the new cement-mortar lined ductile iron pipes installed as part of this project will improve hydraulic conveyance compared to existing conditions by eliminating significant hydraulic restrictions in the system. As an example, when there is a high demand, say 1,000 gallons per minute (water supply for fire fighting flow needed for a significant residential fire) on a single 8-inch older unlined cast iron tuberculated water main at a length of 500 linear feet (typical city block), the hydraulic energy losses are

approximately 5 times that of a new 8-inch diameter ductile iron pipe. For this example, an additional 25 psi pressure would be needed to supply the 1,000 gallons per minute through a single 500 foot long section of 8-inch older unlined cast iron tuberculated water main as compared to a new 8-inch diameter ductile iron pipe. This 25 psi pressure is currently lost in the system and could be recovered if the older unlined cast iron tuberculated water mains are replaced with new diameter ductile iron pipe. This hydraulic computation is based upon C-factors (Hazen-Williams coefficients) of:

- 100 for new cement-mortar lined ductile iron pipe (this accounts for losses in valves, bends and fittings in the system, as compared to the 150-157 range identified by DIPR for straight pipe); and
- 40 for the existing older unlined cast iron tuberculated water main based upon actual field flow test data for similar type water mains.

Further to this example, over 13 kW in energy would be required to provide the additional 25 psi at 1,000 gallons per minute through 500 feet of water main for an hour. Overall, the installation of new diameter ductile iron pipe as part of this project will eliminate significant hydraulic energy restrictions within the water distribution system.

Other Impacts Mitigated by this Project

In addition to the water and energy efficiencies explained above, main replacements at the other locations listed in Table 1 will greatly reduce the potential for future water main breaks. Water main breaks result in a wide variety of impacts, described below:

- Cost (labor/equipment/fuel/materials) of break repair: it is estimated that DC Water expends approximately 200 hours of labor and equipment resources for investigating, isolating, excavating, repairing, backfilling, flushing, testing and permanently restoring the paved surface. Also, there are material costs (repair sleeves, pipe fittings, pavement, etc.) expended by DC Water. Costs per main repair are estimated at \$25,000. If this project were not constructed, DC Water would expend approximately \$375,000 per year in direct main repair costs to repair the 15 or so main breaks per year that would be expected. As some of the locations identified are in the proposed Anacostia 2nd High Service Area (south of W Street, SE; east of 295; and west of 15th Street/ Mississippi Avenue, SE) where pressure will increase 22.5 psi, it is expected that the potential number of main breaks would further increase.
- Taking the water main out of service in an emergency to isolate the failure directly impacts the residents and business within the shutdown limits. This may result in economic impacts to businesses forced to close when water is shut off without notice. Businesses could not continue as usual, meaning loss of revenue and possible temporary loss of pay for employees. In addition, other customer classes affected, such as medical offices and clinics, schools and residences will see impacts that are tangible even though difficult to estimate economically. It is estimated that 1,000 customers are directly serviced from the water mains scheduled for replacement under this project.
- Water main breaks, and the associated repair activities, increase the risk of contamination of the drinking water supply, particularly if the break occurs in the vicinity of sanitary sewers. Reducing the frequency of water main breaks through planned water main replacement provides clear benefits in terms of reduced risk to public health and repair requirements of DC Water.

- A water main failure causes erosions of the surrounding in-situ material, which may result in undermining the road surface, other utilities (electric, gas, telephone, etc.) or neighboring building and the creation of a sinkhole - depending on the location and type of failure. For this project it is difficult to quantify the related erosion caused by a water main break but it is safe to assume that breaks generally result in disruption to pedestrian and vehicular traffic and may result in damage to other utilities (electric, gas, telephone, etc.) and/or personal / property damage.
- The increasing frequency of water main breaks in a main that has reached the end of its useful service life increases the potential of impacts on fire protection. Fire fighters may be required to extend hoses and equipment to adjacent water sources when a main is out of service for repair and/or find a water main with sufficient pressure to fight the fire in an effective manner. Also, the new water mains installed as part of this project will have better hydraulic characteristics than the existing and will improve system fire flow capacities.

Conclusion

By implementing this water main replacement project, DC Water will generate water and energy savings and minimize other impacts in the many ways identified above. Specifically, based upon the water and energy efficiencies presented above, Small Diameter Water Main Rehabilitation 7 project clearly qualifies towards the 20% Green Project Reserve.

3. Project Costs and 4. Timeline

It is anticipated to bid this project on or about June 14, 2011, if not earlier. Construction is anticipated to begin before December 1, 2011 and be completed by November 30, 2013. Between December 1, 2011 and November 30, 2013, an estimated \$16,200,000 will be expended to complete this project. The spending projection is shown below:

Fiscal Year 2012			
First Quarter	Second Quarter	Third Quarter	Fourth Quarter
10/01/11 through 12/31/11	01/01/12 through 03/31/12	04/01/12 through 06/30/12	07/01/12 through 09/30/12
\$0	\$700,000	\$1,500,000	\$2,000,000

Fiscal Year 2013			
First Quarter	Second Quarter	Third Quarter	Fourth Quarter
10/01/12 through 12/31/12	01/01/13 through 03/31/13	04/01/13 through 06/30/13	07/01/13 through 09/30/13
\$2,100,000	\$2,125,000	\$2,125,000	\$2,125,000

Fiscal Year 2014			
First Quarter	Second Quarter	Third Quarter	Fourth Quarter
10/01/13 through 12/31/13	01/01/14 through 03/31/14	04/01/14 through 06/30/14	07/01/14 through 09/30/14
\$2,025,000	\$1,500,000	\$0	\$0

5. Readiness to Proceed to Construction

Design is underway. It is planned to bid this project on or about June 14, 2011 or earlier. Construction is anticipated to begin on November 11, 2011 and be completed by November 9, 2013.

6. Permit Status

This project requires DDOT Public Space Permits and the contract documents will require that the contractor procure the permits prior to commencing construction.

7. Familiarity with implementing Federal regulations related to contracts, anti-discrimination, grants, wages, etc. – description need

DC Water has received EPA grants since 1967 to present and DC Water is familiar with all EPA grant guidelines, and contract provisions, including Davis Bacon Wage Rates.

8. Use of Federal funds-Organization/agency has successfully completed a project supported by Federal Grants

DC Water received millions in federal funds in FY 2009. DC Water successfully completed and closed multiple projects. Please see Audit of Federal Awards Programs Year Ended September 30, 2009, Schedule of Findings and Questioned Costs Year Ended September 30, 2009 on the next page.

**DISTRICT OF COLUMBIA WATER AND SEWER AUTHORITY
SCHEDULE OF FINDINGS AND QUESTIONED COSTS
YEAR ENDED SEPTEMBER 30, 2009**

Section I - Summary of Auditor's Results

Financial Statements

The type of auditor's report issued on the financial statements Unqualified

Internal control over financial reporting:

- Material weaknesses identified? No
- Significant deficiencies identified that are not considered to be material weaknesses? None Reported

Noncompliance material to the financial statements noted? No

Federal Awards

Internal control over major programs:

- Material weaknesses identified? No
- Significant deficiencies identified that are not considered to be material weaknesses? None Reported

The type of auditor's report issued on compliance for major programs Unqualified

Any audit findings disclosed that are required to be reported in accordance with Section 510(a) of OMB Circular A-133? No

Identification of major programs:

<u>CFDA Number</u>	<u>Name of Federal Program or Cluster</u>
66.458	Environmental Protection Agency – Clean Water Act
66.468	Environmental Protection Agency – Safe Drinking Water Act
99.UNK	Congressional Appropriation – Combined Sewer Overflow

Dollar threshold used to distinguish between Type A and Type B programs: \$819,946

Auditee qualified as low-risk auditee under Section 520 of OMB Circular A-133 No

9. Administrative competence-does organization/agency have staff specifically tasked with grants reporting and tracking

DC Water employs full time staff members within the Department of Engineering and Technical Services and Chief Financial Officer whose primary duties include grants administration. DC Water's staff members work closely together with the Army Corps of Engineers in conjunction with the Region III Office Project Director, Ken Pantuck.

10. Job creation – Number of jobs project will create

Small Diameter Water Main Rehabilitation 7

Contract Cost: \$14,000,000

Duration: 2 years

Estimated FTEs: 40